



# Understanding the Whole of Military Health Systems

The Defence Healthcare Cycle

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# Understanding the Whole of Military Health Systems

## The Defence Healthcare Cycle

Martin Bricknell and Paul Cain

The provision of healthcare for military personnel and veterans is an important component of the covenant between the state and its armed forces. While most emphasis is placed on the field medical system, the majority of clinical activity and healthcare costs arise from healthcare in garrisons and for veterans. In this article, Martin Bricknell and Paul Cain propose a high-level concept for a whole-of-military healthcare system that encompasses both operational and non-operational health services – the defence healthcare cycle.

The provision of healthcare for military personnel and veterans is an important component of the covenant between the state and its armed forces. The military medical system may also be a significant part of the government-controlled health economy and may have a significant role in a country's response to national crises through providing medical support to the armed forces on military operations and providing assistance to the civilian health system. In most states, the military medical system for the armed forces is publicly funded and organised by the ministry of defence.<sup>1</sup> This is normally separate from the public health system for the state's citizens. This military medical system has two strategic roles: to provide health services for armed forces personnel and other entitled beneficiaries from a fixed network of medical treatment facilities; and to support the armed forces on military operations both within and external to the state.<sup>2</sup> The beneficiaries of this medical system will include armed forces

personnel (active duty and reserves) and may also include their families, as well as veterans, retirees, civilians working for the ministry of defence and non-military civilians.<sup>3</sup> This may be a very substantial non-salary benefit of military service. The definition of entitlement that determines access to the military medical system will vary by country; for the purpose of this article this whole group is called the 'defence patient'.

This article uses 'defence' to cover the whole system, 'armed forces' to cover the uniformed military services and 'joint' to cover integration of the medical services for the navy, army and air force. The term 'veteran' is used for an ex-military patient with a long-term medical condition directly attributable to military service and the term 'retiree' is used for an ex-military patient who left military service at the end of his or her contract with no attributable health condition. This distinction between the last two terms may be an important policy decision in the allocation of financial responsibilities for the

1. Worldwide Military-Medicine, 'Almanac Military Medical Corps Worldwide', <<https://www.military-medicine.com/>>, accessed 6 December 2019.
2. Justin Woodson, 'Roles and Responsibilities of the Military Medical Officer', in Francis G O'Connor, Eric B Schoomaker and Dale C Smith (eds), *Fundamentals of Military Medicine* (Washington, DC: Borden Institute, 2019).
3. Martin C M Bricknell, 'Entitlement to Military Healthcare - Limitations of the NHS Model', *Journal of Public Health* (Vol. 21, No. 3, 1999) pp. 325–30.



provision of long-term healthcare for ex-military patients between the military health system and the wider public health system.

This article illustrates the care pathway for defence patients from joining the armed forces as a recruit through garrison-based community health services and care during military operations to hospital and specialist clinical services and finally transition to retiree or veteran. The article examines the unique opportunities for integrating clinical services, clinical and managerial information, and health, welfare and support services for defence patients compared with citizens' services. It also examines two structural tensions: the first between the numbers and skill-mix required to deliver garrison health services and the requirements to support military operations; and the second between supporting the current force and the duty to provide long-term care for those injured or sick from previous conflict.

In many countries the cost of health services is rising due to improvements in technology and the range of treatments. This is forecast to be unsustainable for current health systems because of the increased longevity of their populations and the lack of sufficient healthcare workers.<sup>4</sup> These challenges equally apply to military medical services with the additional complication of competing against investment in wider military capabilities from the ministry of defence's budget. Many countries' armed forces are reorganising their medical services to reduce costs by deepening the symbiosis with the public health system and by shifting from healthcare services which are oriented specifically to navies, armies and air forces to an integrated, joint system. For example, armed forces personnel receive hospital care from the public health system in the UK, Australia and Canada.<sup>5</sup> The US is undertaking a major reorganisation to place all military hospitals under the Defence Health Agency and to reduce

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4. Mark Britnell, *Human: Solving the Global Workforce Crisis in Health Care* (Oxford: Oxford University Press, 2019).  
5. NHS, 'Armed Forces Healthcare', <<https://www.nhs.uk/using-the-nhs/military-healthcare/>>, accessed 5 December 2019; Worldwide Military-Medicine, 'Almanac: Australia, Commonwealth of', <<https://www.military-medicine.com/almanac/16-australia-commonwealth-of.html>>, accessed 5 December 2019; Worldwide Military-Medicine, 'Almanac: Canada', <<https://www.military-medicine.com/almanac/30-canada.html>>, accessed 5 December 2019.

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the number of military medical personnel.<sup>6</sup> It is likely that the organisation and costs of military health services will come under further scrutiny as countries rebalance their defence budgets to adjust to the economic costs of the coronavirus crisis. However, this article does not consider how military health services have contributed to the civil–military response to this crisis.

Military doctrine considers military capabilities as an integration of multiple dimensions. For the UK this is summarised as the Defence Lines of Development under the mnemonic TEPIDOIL (training, equipment, personnel, information, doctrine, organisation, infrastructure, logistics; and for medical subjects – clinical).<sup>7</sup> Many military medical services have mature doctrine for operational medical support, but there is very little published work on doctrine and concepts for non-operational medical support.<sup>8</sup> This article proposes a high-level concept for the design of a complete military healthcare system that encompasses both operational and non-operational health services – the defence healthcare cycle – in order to highlight the inter-relationships between the two systems.

### The Defence Healthcare Cycle

The defence healthcare cycle reflects an evolution of thinking as the boundaries between military medical systems and wider public health systems have become more blurred. For the UK, the military health system needed to fundamentally deepen its relationship with the National Health Service (NHS) when independent military hospitals were abolished as part of military reform in the 1990s. This led to the creation of Ministry of Defence Hospital Units that provided military healthcare personnel within NHS hospitals to maintain their clinical competencies and to assist with caring for military patients.<sup>9</sup> Reformulation of concepts for operational health services for the UK armed forces

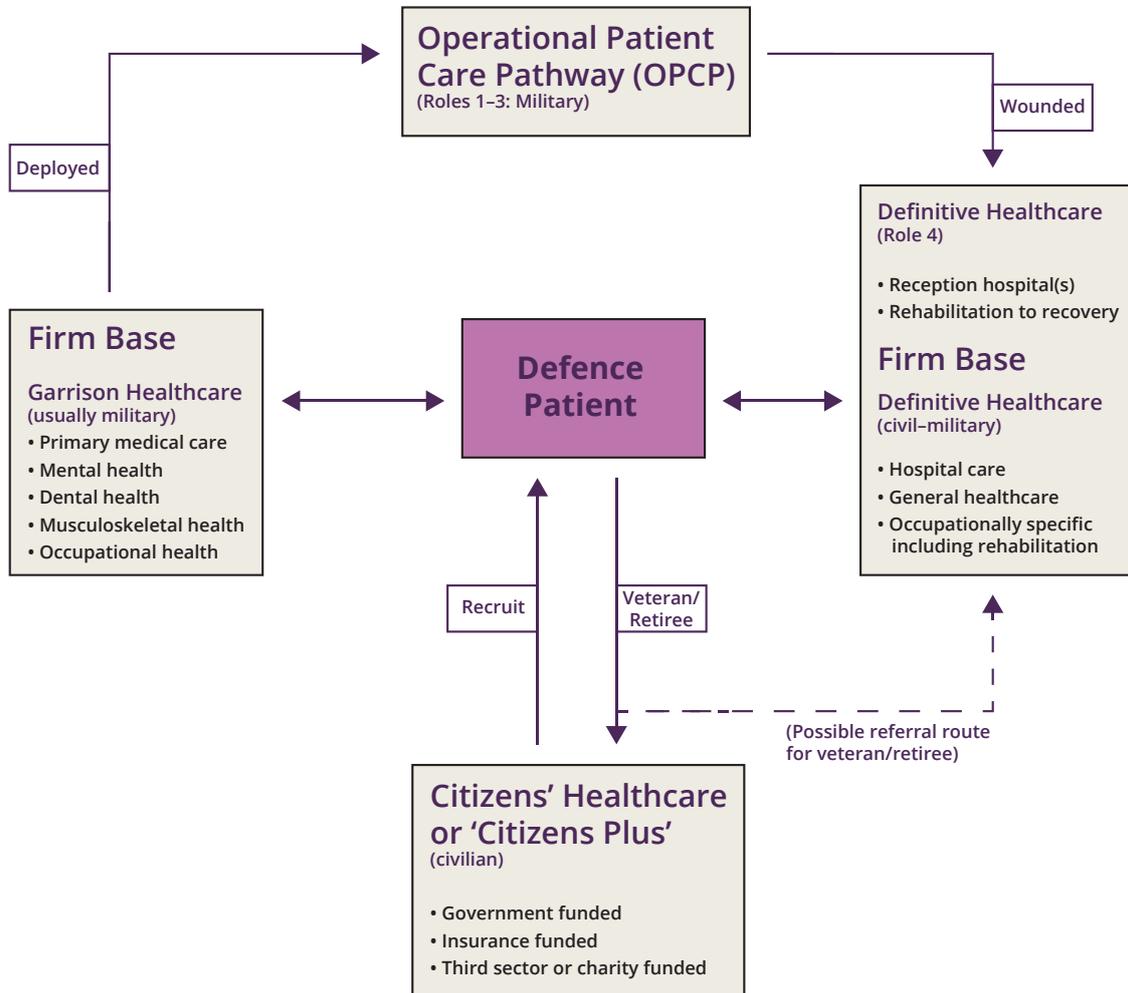
in the past decade has explicitly recognised the role of the NHS in the care of military personnel.<sup>10</sup> The merging of the primary care services of the Royal Navy, the British Army and RAF into the Defence Primary Healthcare created new mechanisms for the commissioning of health services by the NHS for armed forces personnel alongside the unification of the Defence Primary Healthcare workforce across the armed services and civilians.<sup>11</sup> This created the opportunity to further develop the conceptual model for the military health system – the defence healthcare cycle, as shown in Figure 1. Although this will be explained by reference to the UK context, many of these principles are generic and can be extrapolated to any military health system. Indeed, the non-operational elements of many military medical systems are already organised on a joint basis (for example, in Germany, India, Pakistan, Taiwan and Australia). Furthermore, this model explicitly recognises the need to consider how the government meets its obligations towards military personnel who develop long-term health problems as a result of their military service that extend into their post-military life as a veteran or retiree.

The defence healthcare cycle explicitly captures the potential for integration of military and civilian healthcare services to meet the needs of the defence patient and may also highlight opportunities for civilian patients to access the military pathway. While it has components that arise from the individual armed services (the navy, army or air force), it is likely that some healthcare services will be organised to be delivered to all beneficiaries regardless of the originating service. Furthermore, a proportion of the ministry of defence healthcare workforce will be civilian, so the people are ‘defence’ rather than just ‘joint’ (that is, the integration of navy, army and air force).

The design of health systems is increasingly centred on the patient in order to emphasise the need for integration between clinical services and especially to improve care across the boundary

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6. Terri Tanielian and Carrie Farmer, ‘The US Military Health System: Promoting Readiness and Providing Health Care’, *Health Affairs* (Vol. 38, No. 8, 2019), pp. 1259–67.
  7. Ministry of Defence (MoD), ‘How Defence Works’, Version 4.2, 1 December 2015.
  8. NATO Standardization Office, ‘Allied Joint Doctrine for Medical Support’, AJP 4.10, Edition C, Version 1, September 2019; Department of the Army et al., ‘Joint Health Services’, Joint Publication 4-02, 11 December 2017, updated incorporating Change 1, 28 September 2018.
  9. Alastair MacMillan, ‘Defence Costs Study 15’, *Journal of the Royal Army Medical Corps* (Vol. 142, No. 1, 1996), pp. 3–8.
  10. Martin Bricknell, ‘For Debate: The Operational Patient Care Pathway’, *Journal of the Royal Army Medical Corps* (Vol. 160, No. 1, 2014), pp. 64–69.
  11. John E Burgess et al., ‘Formation of Defence Primary Healthcare: A New Way of Delivering Firm Base Primary Healthcare’, *Journal of the Royal Army Medical Corps* (Vol. 163, No. 2, 2017), pp. 89–93.

**Figure 1:** The Main Paths and Components of the Defence Healthcare Cycle



**Healthcare Roles**

- Role 1 – Primary healthcare
- Role 2 – Resuscitation care
- Role 3 – Deployable hospital care
- Role 4 – Non-deployable specialist capabilities

Source: The authors.

of community health services and hospitals, as exemplified by the NHS’s Long-Term Plan.<sup>12</sup> The defence healthcare cycle also places the beneficiaries of the system at the centre. It uses the term ‘defence patient’ to cover all personnel entitled to receive healthcare from any component of the healthcare system. This highlights the importance of defining the list of beneficiaries for the military health

system, the defence population at risk (personnel partially or fully entitled to receive health services from the defence health system), as an explicit policy decision because it will drive the attribution of costs for firm base healthcare. ‘Firm base’ is the term used to encompass the network of fixed medical treatment facilities that provides healthcare services to the defence patient on a geographic

12. NHS, ‘Online Version of the NHS Long Term Plan’, Version 1.2, August 2019, <<https://www.longtermplan.nhs.uk/online-version/>>, accessed 5 December 2019.

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basis. It is likely that this will involve discussion at government level between the ministries of finance, defence and health. Subjects for consideration will include: attribution of costs for military personnel who require referral into the civilian health system for clinical services not present in the military health system; attribution of costs for long-term health needs resulting from conditions attributable to military service; attribution of costs for health needs arising after military service (veterans and retirees), especially predictable, age-related conditions; and attribution of costs for non-defence civilians treated within the military health system for the purpose of maintaining the skill-mix for military healthcare professionals.

The defence healthcare cycle shows the whole system of care for the defence patient across his or her life course. All defence patients are also citizens of their parent country and so the civilian public health system is also part of their health system (even if only in childhood). Figure 1 is divided into four components: citizens' healthcare; firm base (encompassing garrison healthcare and definitive healthcare); and the operational patient care pathway (OPCP). A uniformed member of the armed forces starts as a civilian in receipt of public healthcare from the state health system as an entitlement of being a citizen. Once recruited to the armed forces, they have access to garrison healthcare based on their place of work. If deployed, they receive healthcare organised as the OPCR in Role 1, 2 and 3 medical treatment facilities, as defined by NATO.<sup>13</sup> The OPCR provides a unifying model for medical operational capability and provides a concept for seamless medical care from point of injury through to evacuation back to the parent state from overseas. It is already well-described within UK medical doctrine and the principles are contained within other national and NATO military medical doctrines.<sup>14</sup> As such, the concepts that underpin the OPCR are not considered further in this article. The skills required of military healthcare practitioners to meet their role within the OPCR are heavily skewed towards emergency medicine, trauma care and infectious diseases, but these conditions are not routinely part of firm base healthcare for military patients. Furthermore, the potential volume of patients during high-intensity military operations will be substantially more than the routine demands on the firm base military health

system. Therefore, the competencies required of healthcare providers to support large-scale military operations are likely to be very different from the baseline for the uniformed workforce in the firm base.

If they are wounded or sick, defence patients who require medical evacuation from military operations are received into the Role 4 definitive healthcare system (primarily hospitals). A small number of patients may return direct from operations to garrison healthcare – so called 'discharge at airhead'. Armed forces personnel on discharge from regular service may return to having access to citizens' healthcare as a veteran (if they do not have ill-health conditions that are attributable to military service) or retiree (if access to military healthcare services is not part of their retirement benefits). This is the core, clockwise cycle shown in Figure 1. It is also possible for a regular service person to be referred direct from garrison healthcare to definitive healthcare and to recover; or to be discharged from the OPCR or definitive healthcare back to garrison healthcare. These pathways are shown in Figure 1 as two-way arrows. The overall process may be the same for reserve members of the armed forces, either as a benefit of reserve service or for the period of their mobilisation into regular service. There may be similar or further restrictions on entitlement for families of armed forces personnel, entitled ministry of defence civilian employees or civilians.

### Firm Base Healthcare

Firm base healthcare covers the two components of garrison healthcare and definitive healthcare. 'Firm base' separates these arrangements from the mobile and deployable component of the defence healthcare system that supports the OPCR. Firm base healthcare is almost invariably a combination of military-delivered, military-provided (possibly contracted) and citizen-entitlement services. The balance varies between states. It is important that there is oversight of this whole system by the military leadership to ensure that defence patients have access to safe, effective and efficient healthcare in the firm base (both inside the state and possibly overseas) to meet their clinical needs and the requirements of their employer.

13. Role 1 is primary healthcare; Role 2 is resuscitation care; and Role 3 is deployable hospital care. See Department of the Army et al., 'Joint Health Services', Chap. 2.

14. Bricknell, 'For Debate: The Operational Patient Care Pathway'.

## Garrison Healthcare

Garrison healthcare covers the health services delivered within military garrisons (a geographically defined community of military units and supporting organisations). It encompasses the clinical services of primary medical care, dental care, mental healthcare, rehabilitation and occupational health that are embedded within garrisons, similar to arrangements for these services within local communities in the civilian sector. The effect for the defence patient must be integrated across these services to meet their physical and mental health needs. The military health system is primarily an occupational health service and so these clinical services are oriented to the promotion of wellbeing, prevention of ill health and recovery to fitness for role. Furthermore, the uniformed population is primarily young adults who have already been selected as medically fit for military service and so the majority of medical conditions are short-term musculoskeletal or mental health disorders with a very low incidence of serious, long-term health conditions.<sup>15</sup> This requires a garrison health service with a very different skill-mix from civilian health systems. While benefits from the integration of community-based clinical services can apply to civilian as well as military populations, the military healthcare system may have a unique opportunity to exploit this integration through a single organisation that can co-locate services, mandate a common medical information system, and direct clinical leadership and responsibility across professional boundaries. The whole military organisation may also have influence over the wider, social determinants of health. Social health needs may be met by garrison services such as adjustments to employment by the chain of command, welfare services, religious support, military housing, and so on. These services may be provided directly by the ministry of defence using its employees or may be commissioned by other providers, especially for defence patients employed away from military

garrisons or overseas. The US TRICARE system is an example of large-scale commissioned healthcare services that provides pre-arranged access to local civilian medical facilities with a global footprint for defence patients.<sup>16</sup>

## Definitive Healthcare

Definitive healthcare is primarily provided by hospital services. Defence patients may be referred to military hospitals, contracted clinical services or the public health system on the basis of their entitlement as a citizen. Many states' ministries of defence maintain military hospitals (for example, the US, France, Germany, Spain, Italy, the Czech Republic and Hungary) to ensure access to healthcare for defence patients that meets the requirements of the ministry of defence as an employer (including immediate access to hospital beds for defence patients repatriated from overseas) and also to ensure hospital-based military medical personnel maintain the necessary clinical skills. There is also a requirement for referral services for specialist occupational assessment and investigation of armed forces personnel in aviation medicine, underwater medicine, environmental medicine and other aspects of employment within the armed forces that may not be covered by the civilian public health system. Some states have specialist military medical institutes that combine research and clinical assessment in these fields.<sup>17</sup>

However, it is expensive to operate military hospitals and many are only viable if the clinical throughput includes the wider civilian population.<sup>18</sup> In some countries, there is a perception that the overhead costs can be transferred to the public or commercial sector with a resultant saving to the ministry of defence.<sup>19</sup> Furthermore, it may prove difficult to balance the skills needed for military clinicians (high acuity medical and surgical practice associated with major urban centres) with the

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15. Benjamin F Mundell et al., 'US Military Primary Care: Problems, Solutions, and Implications for Civilian Medicine', *Health Affairs* (Vol. 32, No. 11, 2013), pp. 1949–55.
  16. David J Smith, Raquel C Bono and Bryce J Slinger, 'Transforming the Military Health System', *Journal of the American Medical Association* (Vol. 318, No. 24, 2017), pp. 2427–28.
  17. MRDean, 'An Overview of the Institute of Naval Medicine', *Journal of the Royal Naval Medical Service* (Vol. 91, No. 3, 2005), pp. 164–66; Malcolm Braithwaite et al., 'Armed Forces Occupational Health – A Review', *Occupational Medicine* (Vol. 59, No. 8, 2009), pp. 528–38; Wee Hoe Gan, Rayden Low and Jarnail Singh, 'Aviation Medicine: Global Historical Perspectives and the Development of Aviation Medicine Alongside the Growth of Singapore's Aviation Landscape', *Singapore Medical Journal* (Vol. 52, No. 5, 2011), pp. 324–29; Naval Medical Research and Development, 'About Us', <<https://www.med.navy.mil/sites/nmrc/Pages/About.aspx>>, accessed 5 December 2019.
  18. Ehsan Teymourzadeh et al., 'Economic Performance Analysis of Selected Military Hospitals Using Hospital Indicators and Inpatient Bed-Day Cost', *Hospital Practices and Research* (Vol. 4, No. 1, Winter 2019), pp. 31–38.
  19. Arthur Kellermann, 'Rethinking the United States' Military Health System', *Health Affairs Blog*, 27 April 2017.

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breadth of family and community medicine needed for the whole defence patient population (including children, mothers and the elderly) in rural military garrisons.<sup>20</sup> Thus, the choice between the ministry of defence operating hospitals for defence patients and contracting hospital services from the civilian public or private systems will vary between states and depend on the availability of local services. This choice will be informed by comparisons of clinical services, clinical performance, timeliness of access and the needs of the ministry of defence as an employer (particularly to manage active recovery and recuperation back to work) between options.

The reception of military casualties from military operations into the firm base is a discrete component of the OPCP. This is covered by the definition of a Role 4 Medical Treatment Facility definitive hospital response capability that 'offers the full spectrum of definitive medical care that cannot be deployed to theatre or will be too time consuming to be conducted in theatre'.<sup>21</sup> This requires a hospital that has 24-hour availability of the range of specialist clinical services that can meet the health needs of a severely sick or injured military casualty. There is an additional requirement to also meet the military administration and social needs of the patient's family who may not be normally resident in the vicinity of the receiving hospital. Some militaries provide specialist social and welfare services (for example, the UK, the US and Germany), including hotel accommodation, as part of this package of care; this may substantially exceed the public provision for civilians in the same circumstances.<sup>22</sup>

Residential rehabilitation and recovery services are the final component of the Role 4 care pathway for severely injured or sick defence patients. The ministry of defence as an employer has highly demanding medical standards for rehabilitation fitness for military roles which may exceed the expected outcome from civilian rehabilitation and recovery services. This may require these services to be delivered within a military setting that provides an additional benefit of reintroducing the military culture and structure of work as part of the recovery process from injury or illness.<sup>23</sup> This residential

clinical service will need to cover the defence patient's physical, mental and social needs, including seamless transition back to these clinical services in garrison healthcare once their need for residential services has ended. While described as a Role 4 clinical service to emphasise the link to the OPCP, residential rehabilitation and recovery is also a key component of rehabilitation referral services from garrison healthcare for defence patients injured or sick during routine military training or from concurrent illness (for example, strokes or after joint replacement).

## Citizens' Healthcare

In some states the healthcare benefits to defence patients continue after military service to the end of their life and so these individuals never return to the public health system. However, even the notion of an endpoint for military service is blurred. Reservists in the UK serve in the armed forces but their entitlement to healthcare varies by employment type and readiness for operational deployment. The status 'retiree' occurs at the end of military service and, in some countries, this removes the entitlement to ministry of defence-provided services from the serving member and their family. In principle a retiree has reverted to becoming a citizen and therefore receives 'citizens' healthcare' as part of the usual provision of public healthcare services by the state to its citizens. It also includes access to state support for the wider social determinants of health provided to citizens, such as housing, employment support and welfare provision.

Some countries make additional public services' provisions for retirees, especially for veterans (those with ill-health conditions that are attributable to military service). For example, in the UK, the Armed Forces Covenant was introduced to mandate 'no disadvantage' for veterans who receive services from government departments other than the UK's Ministry of Defence, and the term 'veteran' is applied to anyone who has received one day's pay for military service.<sup>24</sup> This includes ensuring that a patient's

20. Mary J Edwards et al., 'Saving the Military Surgeon: Maintaining Critical Clinical Skills in a Changing Military and Medical Environment', *Journal of the American College of Surgeons* (Vol. 222, No. 6, 2016), pp. 1258–64.
21. MoD, 'The Operational Patient Care Pathway', HQ SG/29-08-33, in MoD, 'Joint Service Publication 950', Leaflet 1-4-1, 21 July 2014, p. 13.
22. Sarah Cage-Brimelow, 'The Operational Patient Care Pathway in the Firm Base: The UK Solution', *International Review of the Armed Forces Medical Services* (Vol. 91, No. 3, 2018), pp. 50–59.
23. Peter Ladlow et al., 'Functional and Mental Health Status of United Kingdom Military Amputees Postrehabilitation', *Archives of Physical Medicine and Rehabilitation* (Vol. 96, No. 11, 2015), pp. 2048–54.
24. Armed Forces Covenant, <<https://www.armedforcescovenant.gov.uk/>>, accessed 5 December 2019.

relative position on waiting lists is maintained if they move between NHS commissioners. Healthcare for veterans is extended by specialist services commissioned to meet their specific needs, such as the mental health Transition, Intervention and Liaison Service, Veterans Mental Health Complex Treatment Services, and prosthetic services.<sup>25</sup> This is complemented by voluntary accreditation schemes such as ‘veteran friendly’ general practices,<sup>26</sup> and the Veterans Covenant Healthcare Alliance.<sup>27</sup>

Other states provide separate, government-funded health services that differentiate between retirees and veterans. For example, in the US, the Department for Veterans Affairs has a specific mission ‘To fulfill President Lincoln’s promise “to care for him who shall have borne the battle, and for his widow, and his orphan” by serving and honoring the men and women who are America’s veterans’.<sup>28</sup> This provision beyond the normal citizens’ entitlement might be considered as ‘citizens plus’ government support and lies at the interface between the provision of health services for current active duty military personnel and the wider, long-term obligation of government to meet the needs of military personnel after productive uniformed service as part of the overall package of military benefits.<sup>29</sup> In many countries there is an established role for private insurance schemes of the third sector or charities to provide additional, non-government support to military retirees or

veterans. These may directly provide or commission interventions to improve physical, mental and social wellbeing. In the UK, military charities complement the services provided by the government and represent an additional source of support beyond that available to citizens. Some charities provide financial assistance for all members of the armed forces and their families,<sup>30</sup> or to members of each individual service,<sup>31</sup> some provide welfare services,<sup>32</sup> and others provide care for specific disabilities such as blindness,<sup>33</sup> limb loss<sup>34</sup> or mental health problems.<sup>35</sup> There are similar, non-government charities and health maintenance organisations in many other countries such as the US,<sup>36</sup> Nigeria,<sup>37</sup> and Pakistan.<sup>38</sup> Some of these veterans’ organisations are members of the Royal Commonwealth Ex-Services League.<sup>39</sup>

## Implications of the Defence Healthcare Cycle

The defence healthcare cycle provides a conceptual explanation of a whole military health system and allows the deconstruction of the individual components for the defence patient. It provides the opportunity to explore the choices for each of these components and is especially useful for comparisons of options between countries and options within a country for different models for delivery. The term

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25. NHS, ‘Ex-Forces and Struggling with Your Health?’, <[https://assets.nhs.uk/prod/documents/Mil\\_Vet\\_leaflet\\_FINAL\\_ONLINE.pdf](https://assets.nhs.uk/prod/documents/Mil_Vet_leaflet_FINAL_ONLINE.pdf)>, accessed 5 December 2019.
  26. Royal College of General Practitioners, ‘Veteran Friendly GP Practices’, <<https://www.rcgp.org.uk/clinical-and-research/resources/a-to-z-clinical-resources/veteran-friendly-gp-practices.aspx>>, accessed 5 December 2019.
  27. NHS Improvement, ‘Veteran Aware NHS Trusts’, <<https://improvement.nhs.uk/resources/veteran-aware-hospitals/>>, accessed 5 December 2019.
  28. US Department of Veterans Affairs, ‘Access and Manage Your VA Benefits and Health Care’, <<https://www.va.gov/>>, accessed 5 December 2019.
  29. For example, the provisions contained in the GI Bill in the US. See US Department of Veterans Affairs, ‘About GI Bill Benefits’, <<https://www.va.gov/education/about-gi-bill-benefits/>>, accessed 4 June 2020.
  30. Royal British Legion, ‘We’re Here for the Armed Forces Community’, <<https://www.britishlegion.org.uk/>>, accessed 5 December 2019.
  31. Royal Naval Benevolent Trust, <<http://www.rnbt.org.uk/>>, accessed 5 December 2019; ABF The Soldiers’ Charity, <<https://soldierscharity.org/>>, accessed 5 December 2019; Royal Air Force Benevolent Fund, <<https://www.rafbf.org/>>, accessed 5 December 2019.
  32. SSAFA, ‘Welcome to SSAFA’, <<https://www.ssafa.org.uk/>>, accessed 5 December 2019.
  33. Blind Veterans UK, <<https://www.blindveterans.org.uk/>>, accessed 5 December 2019.
  34. Blesma, <<https://blesma.org/>>, accessed 5 December 2019.
  35. Combat Stress, <<https://www.combatstress.org.uk/>>, accessed 5 December 2019.
  36. Hope for the Warriors, <<https://www.hopeforthewarriors.org/>>, accessed 5 December 2019.
  37. Defence Health Maintenance Limited, <<https://www.dhmlnigeria.com/>>, accessed 5 December 2019.
  38. Army Welfare Trust, <<http://www.awt.com.pk/>>, accessed 5 December 2019.
  39. Royal Commonwealth Ex-Services League, <<http://www.commonwealthveterans.org.uk/member-organisations.php>>, accessed 5 December 2019.

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'defence patient' also enables the deconstruction of the beneficiaries of the defence healthcare cycle and especially emphasises the notion that a defence patient remains a citizen of a state, even if they have additional or different benefits arising from military service. It highlights the importance of formally identifying the beneficiaries from the defence population at risk as a cross-government policy decision that drives the allocation of healthcare costs for defence patients between government ministries.

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### The defence healthcare cycle is a potential model to describe the complete system and allow exploration of choices in organisational and clinical design to meet the organisational and clinical needs of the armed forces

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This defence healthcare cycle describes the inter-relationship between the four components of the healthcare system. It recognises the benefits of integration across clinical services within each component, especially the garrison healthcare component of the firm base. It illustrates the importance of a whole system view for both organisational governance and from the perspective of a patient through their journey between different providers. This is particularly relevant in the design of clinical and management information systems that support the delivery of health services across the defence healthcare cycle. In principle this should be simple as the defence healthcare cycle is under unified oversight of the ministry of defence, but it is complicated by global dispersal of patients and medical facilities, integration with civilian clinical systems, and the different information needs of clinical and administrative users.

There is scope for further analysis of the components of the defence healthcare cycle to the level of precision that has been applied to medical doctrine for the OPCP. Garrison healthcare is the core of the defence healthcare cycle through

an individual's military career. This relationship between the uniformed patient, their commander and military garrison health services that is unified to the common purpose of maximising military performance is at the heart of military medicine. In the UK, the military medical services have had a significant influence on the evolution of general practice, occupational medicine and public health medicine on the basis that the healthcare for military garrisons was already structured as a population-centred clinical service.<sup>40</sup> Internationally, some military medical services are trying to ensure that the status of these community-health practitioners is balanced against the status of hospital-based clinicians. An example is the establishment of a Faculty of Military Medicine by the Irish College of General Practitioners.<sup>41</sup> This article does not fully explore the potential synergies that could be achieved from further integration of primary care, dental health, mental health, musculoskeletal health and occupational health services on a community basis. Further analysis could include concepts for new models of care that distribute the use of healthcare professionals in a way that improves care pathways, fully uses the distinct skills of staff groupings and is more sustainable.

It is likely that there will continue to be pressure across military medical services to demonstrate value and reduce their proportion of costs within the defence budget. Staffing is a very significant operating cost for ministries of defence<sup>42</sup> and healthcare staffing (especially doctors) can be considered expensive.<sup>43</sup> Figure 1 shows the potential overlap (or duplication) for military medical personnel assigned to the firm base and also the OPCP. Designing the best balance between active duty, reserve, mobilised civilian volunteers and civilian personnel to meet the numbers and skill-mix required by the whole defence health cycle is a discrete subject for further analysis. However, it is a further example of where the needs of defence have to be placed within the context of a country's overall health economy.

In many countries the number, size and scope of military hospitals have been reduced where there is an opportunity for public or commercial providers to take on clinical work that does not require uniformed healthcare practitioners. For example, in Turkey all

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40. Kristian Mears et al., 'General Practice in the Armed Forces: A Definition and Model', *Journal of the Royal Army Medical Corps* (Vol. 158, No. 3, 2012), pp. 156–61.

41. Irish College of General Practitioners, 'Faculty of Military Medicine', <[https://www.icgp.ie/go/become\\_a\\_gp/faculty\\_of\\_military\\_medicine](https://www.icgp.ie/go/become_a_gp/faculty_of_military_medicine)>, accessed 5 December 2019.

42. NATO, 'Defence Expenditure of NATO Countries (2013–2019)', <[https://www.nato.int/cps/en/natohq/news\\_171356.htm](https://www.nato.int/cps/en/natohq/news_171356.htm)>, accessed 4 June 2020.

43. Kellermann, 'Rethinking The United States' Military Health System'.

military hospitals were transferred to its ministry of health in 2016.<sup>44</sup> However, it will continue to be important to define the necessary occupational referral services that the defence patient requires. This will include more than specialist knowledge in the environments of altitude, depth, heat and cold: it will bring in occupational aspects of all body systems such as eyes, ears, skin, circulation, digestion and mental function. Rehabilitation and recovery to a military occupation or a purposeful life as a civilian is also likely to remain an essential output of the defence healthcare cycle. Thus, the input costs of the military medical system need to be balanced against the output value of a maximally fit (physically, mentally and socially) armed force and the contribution of an assured and capable military operational health system to the moral component of fighting power.

## Conclusions

As identified at the beginning of this article, many military health systems are undergoing substantial review and change. In many militaries there is a well-established analytical process for the management of military operational capabilities, and this has been applied to medical support on military operations – the OPCP. However, there is scope for the same approach for medical support to be applied to defence patients not on military operations. The defence healthcare cycle is a potential model to describe this complete system and allow exploration of choices in organisational and clinical design to meet the organisational and clinical needs of the armed forces.

The article identifies the critical policy decisions around the definition of the defence patient as a beneficiary of the military health system. It uses the defence healthcare cycle to illustrate the interdependence of the public civilian healthcare system, garrison healthcare, the OPCP and the hospital-oriented definitive healthcare system.

It is likely that the purposes, costs and value of military medical services will come under further

scrutiny as defence budgets are reviewed to balance the wider economic costs of the coronavirus pandemic. While the contribution of military medical services to the civil–military government response to this crisis is beyond the scope of this article, it is hoped that the defence healthcare cycle will generate further debates about the development of concepts and medical doctrine for the entirety of military health systems. This can inform strategic choices such as: the balance of costs and obligations between the ministries of defence, health, wider social insurance and charities; the healthcare workforce plan to meet the needs of the armed forces within a state's health economy; the procurement and integration of medical information systems for the benefit of the defence patient across healthcare providers; and decisions regarding core military medical capabilities that must be retained under military control versus those that can be commissioned or contracted from external providers. ■

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44. Selim Vatandaş, 'The Patterns of Civil-Military Relations: The Western Standards and Turkey's Experience', *INSAMER*, 30 October 2018, <[https://insamer.com/en/the-patterns-of-civil-military-relations-the-western-standards-and-turkeys-experience\\_1745.html](https://insamer.com/en/the-patterns-of-civil-military-relations-the-western-standards-and-turkeys-experience_1745.html)>, accessed 5 December 2019.